SYNOPSIS

PhD in Physical Education

EFFECT OF HIGH INTENSITY INTERVAL TRAINING, AEROBIC TRAINING AND CONCURRENT TRAINING ON SELECTED PHYSICAL, PHYSIOLOGICAL AND SKILL PERFORMANCE VARIABLES AMONG FOOTBALL PLAYERS

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INTRODUCTION

Football is a physically demanding sport that requires players to exhibit high levels of endurance, speed, agility, strength, and skill execution. To enhance these attributes, structured training programs like High-Intensity Interval Training (HIIT), Aerobic Training (AET), and Concurrent High-Intensity Interval and Aerobic Training (CHAT) are commonly used. Each of these training methods plays a crucial role in improving various physical and physiological parameters essential for football performance. However, their relative effectiveness in optimizing football-specific skills and fitness levels remains an area of interest in sports science.

High-Intensity Interval Training (HIIT) focuses on short bursts of intense activity followed by brief recovery periods, enhancing anaerobic capacity, speed, and agility. Aerobic Training (AET), on the other hand, emphasizes continuous moderate-intensity exercise to improve cardiovascular endurance and recovery ability, and Concurrent High-Intensity Interval and Aerobic Training (CHAT), aiming to maximize endurance, power, and skill execution efficiency. While each method has proven benefits, understanding how they specifically impact physical, physiological, and skill performance variables among football players is essential for optimizing training strategies.

This study examines the effects of High-Intensity Interval Training (HIIT), Aerobic Training (AET), and Concurrent High-Intensity Interval and Aerobic Training (CHAT) on selected physical (muscular strength, endurance, speed, agility, power), physiological (cardiovascular endurance, heart rate), and skill performance (passing, kicking, dribbling, shooting) variables. By comparing these training approaches, the research provides valuable insights for coaches, trainers, and athletes to develop more effective conditioning programs, ultimately enhancing football performance and competitive success.

BACKGROUND OF THE STUDY

Football is a globally popular sport that requires players to perform at high intensities over an extended period. It demands a combination of aerobic endurance, anaerobic power, muscular strength, agility, speed, and technical skills to sustain optimal performance throughout a match. To meet these physical demands, players undergo structured training programs that enhance their fitness and skill levels. Traditional endurance-based aerobic training has long been a fundamental component of football conditioning. However, modern training approaches such as High-Intensity Interval Training (HIIT) and Concurrent High-

Intensity Interval and Aerobic Training (CHAT) have gained attention due to their potential to improve multiple performance variables simultaneously.

HIIT involves short bursts of intense exercise followed by recovery periods, significantly enhancing speed, power, and anaerobic capacity, which are crucial for football players performing repeated sprints and quick directional changes. AET, which focuses on prolonged moderate-intensity exercise, is essential for developing cardiovascular endurance, enabling players to maintain performance over 90 minutes. CHAT, a concurrent of HIIT and AET, is designed to maximize both anaerobic and aerobic benefits, but its specific effects on football-specific physical, physiological, and skill-related performance need further investigation.

Understanding how these training methods influence key performance variables such as muscular strength, endurance, speed, power, agility, cardiovascular fitness, and skill execution (passing, kicking, dribbling, shooting) is crucial for optimizing player development. This study aims to assess and compare the effectiveness of HIIT, AET, and CHAT on football players' overall performance, providing insights that will help coaches, trainers, and athletes refine their training strategies to achieve peak competitive performance.

STATEMENT OF THE PROBLEM

To assess the Effect of High Intensity Interval training, Aerobic training and concurrent training on selected physical, physiological and skill performance variables among Football Players.

OBJECTIVES OF THE STUDY

The study will be significant in following ways

- To find out the effect of High-Intensity Interval Training (HIIT).
- To evaluate the effect of Aerobic Training.
- To investigate the effect of Concurrent High-Intensity Interval Training and Aerobic Training.
- To compare the effectiveness of High-Intensity Interval Training, Aerobic Training, and Concurrent Training.

- To identify which training method produces the most significant improvement in overall performance among intercollegiate men football players.

SIGNIFICANCE OF THE STUDY

1. This study will help enhance physical, physiological, and skill performance in intercollegiate football players, contributing to better overall performance on the field.
2. It will provide coaches with evidence-based insights on combining HIIT and aerobic training for optimal player development.
3. This study addresses the research gap by exploring the combined effects of HIIT and aerobic training specifically for football players, offering valuable contributions.
4. By improving physical conditioning and skill performance, the study may lead to better health outcomes and injury prevention for football players.
5. This research will help practical guidelines to football coaches and fitness trainers to design effective training programs concurrent HIIT and Aerobic training to optimize the physical and physiological development of players.

HYPOTHESIS

1. The experimental groups would demonstrate significant improvements in selected physical variables compared to the control group.
2. The experimental groups would exhibit significant enhancements in selected physiological variables compared to the control group.
3. The experimental groups would display significant improvements in selected skill performance variables compared to the control group.
4. Concurrent Training would be more effective than High-Intensity Interval Training and Aerobic Training in improving overall physical fitness, physiological and skill performance variables among intercollegiate men football players.
5. There would be significant improvements in physical fitness, physiological and skill performance variables among intercollegiate men football players who undergo High-Intensity Interval Training, Aerobic Training and Concurrent Training.

DELIMITATIONS

This study is delimited to the following areas,

- ✓ The study was delimited as to selection of subjects at intercollegiate men football players.
- ✓ The age of the subjects was ranged from 18 to 21 years.
- ✓ The experiment is confine to high intensity interval training and aerobic training programme.
- ✓ The Independent variables were determined for physical physiological and skill performance variables.

LIMITATIONS

This study is limited to the following

- ✓ Rational habits were not considered in this study.
- ✓ The nature of work was not taken into account.
- ✓ Lifestyle factors, including daily routine activities, were not considered.
- ✓ Daily health and dietary habits were not considered.
- ✓ The effects of uncontrollable factors, such as heredity and environmental influences, were also considered limitations of this study.

METHODOLOGY

To fulfil the purpose of the study, a sample of 100 Men Intercollegiate Football players was randomly selected from various colleges within the G.T.N Group of Institution, Dindigul. The age range of the selected participants was between 18 and 21 years. The sample was subsequently divided into four equal groups, each comprising 25 individuals. Group I was assigned to undergo High-intensity interval training, group II was assigned to undergo Aerobic training, group III was assigned to undergo concurrent High-intensity interval training and Aerobic training, while Group IV served as the control group and did not engage in any training program.

The following Criterion measures are were selected by using Standardised tests

DEPENDENT VARIABLES

SI. NO	Variables	Test	Units of measurement	Author	Year
PHYSICAL VARIABLES					
1	Muscular Strength	1-RM Squat Test	In Kilo grams	Baechle & Earle	2008
2	Muscular Endurance	Sit-Ups	In Counts	AAHPERD	1980
3	Speed	50mts Run	In Second	Mackenzie	2005
4	Power	Vertical Jump Test	In Distance	Dudley Allen Sargent	1921
5	Agility	Illinois Agility Test	In Second	Heil et al.	1995
6	Cardiovascular Endurance	Cooper 12-minute Run Test	In Distance	Dr. Kenneth H. Cooper	1968
PHYSIOLOGIVAL VARIABLES					
7	Heart Rate	Short Hand Method	Beats per Minute (BPM)	Aoyagi & Pyon	2002
8	Vo2 Max	Maximal Oxygen Consumption Test	Liters per Minute (L/min)	John Hutchinson	1846
SKILL PERFORMANCE VARIABLES					
10	Passing	Morgan Christian General Soccer Ability Test	In Numbers	Mor & Christian	1979.
11	Kicking	Warner Test for soccer skills	In Scores	Warner	1950
12	Dribbling	Morgan Christian General Soccer Ability Test	In Seconds	Mor & Christian	1979.
13	Shooting		In Scores		

The training groups spent a total of 12 weeks , 3 alternative days a week, completing the required training.

The following statistical technique was used to find out the effect of high intensity interval training concurrent high intensity interval training and aerobic training on selected physical physiological and skill performance among college football players. Dependent "t"- test was used to analyse the difference between pre-test and post-test scores. One-way analysis of variance (ANOVA) was used on the pre-test scores for the four groups on all the selected physical and physiological variables. Analysis of co-variance (ANCOVA) was used for subsequent analysis of selected fitness variables and skill performance. Significant findings from ANCOVA prompted Scheffe's test for post hoc analysis. All tests were performed at the 0.05 alpha level of significance.

FINDINGS OF THE STUDY

This study investigated the impact of High-Intensity Interval Training (HIIT), Aerobic Training (AET), and Concurrent High-Intensity Interval and Aerobic Training (CHAT) on physical, physiological, and skill performance variables among intercollegiate men football players. The results demonstrated that all three training methods significantly improved physical fitness parameters, such as muscular strength, muscular endurance, speed, power, agility, and cardiovascular endurance. Among the experimental groups, the CHAT method was the most effective, as it combined the benefits of both HIIT and AET, resulting in the greatest improvements in speed, agility, and cardiovascular endurance. Furthermore, all training methods led to significant physiological improvements, including reductions in heart rate and increases in VO2 max. Skill performance, particularly passing, kicking, dribbling, and shooting accuracy, also showed significant gains across all groups, with CHAT yielding the highest improvements. These findings emphasize the importance of combining HIIT and AET for optimal football performance and player development.

Conclusions

- Incorporating a variety of training methods such as High-Intensity Interval Training (HIIT), Aerobic Endurance Training (AET), and Concurrent High-Intensity Interval and Aerobic Training (CHAT) leads to greater fitness improvements compared to using just one type of exercise.

- All training methods significantly improved muscular strength, muscular endurance, speed, power, agility, and cardiovascular endurance.

- Concurrent High-Intensity Interval and Aerobic Training (CHAT) produced the most pronounced improvements in muscular endurance, speed, agility, and cardiovascular endurance, showing its effectiveness in combining the benefits of both HIIT and AET.

- Significant improvements were observed in heart rate and VO2 max across all training methods.
- Aerobic Training (AET) resulted in the greatest reduction in heart rate, while Concurrent High-Intensity Interval and Aerobic Training (CHAT) led to the most significant improvement in VO2 max.

- Significant improvements were observed in passing, kicking, dribbling, and shooting across all experimental groups.

- Concurrent High-Intensity Interval and Aerobic Training (CHAT) showed the greatest overall enhancement in skill performance, emphasizing its comprehensive impact on football-specific abilities.

RECOMMENDATION

- Regular practice of High-Intensity Interval Training (HIIT), Aerobic Training (AET), and Concurrent High-Intensity Interval and Aerobic Training (CHAT) is essential for optimizing football performance in physical, physiological, and skill-related aspects.

- Male and female football players at all levels should be trained in Concurrent High-Intensity Interval and Aerobic Training (CHAT) to enhance endurance, speed, and agility for better on-field performance.

- Studies should explore longer training durations, intensity variations, and strength training integration to further optimize fitness outcomes.

- Coaches and physical educators should incorporate these findings into training programs to maximize player development and performance.

- Research on psychological, biochemical, motor fitness, and anthropometric variables across different sports can provide valuable insights for tailored training approaches.

PUBLICATIONS

1.S. Eswari and Dr.T. Shanmugavalli (2024) Optimizing SAQ performance in football athlete exploring the influence of High Intensity Interval training, FIZJOTERAPIA POLSKA, ISSN NO:1642-0136, NR 5/2024 (24).

2. S. Eswari and Dr. T. Shanmugavalli (2024) Impact of High Impact of High Intensity interval training on Specific Physical factors among college male football players, Cuestiones de Fisioterapia, ISSN NO:1135-8599, 2025.54(3):5183-5186.

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